Quarterly Progress Report #13

For the project entitled:

Field Evaluation of the Performance of Three Concrete Bridge Decks on Montana Route 243

Reporting Period: January 1, 2005 – March 31, 2005
(*Quarter 3, State Fiscal Year 2005*)

Summary of Expenditures

The table below summarizes the expenditures on this project through March 31, 2005. Expenditures during this quarter were $4,615.16, with total expenditures through March 31, 2005 equaling $278,197.80.

Budget Category	Spent through 12/31/04	Spent This Quarter	Total Spent
Salaries	$123,642.89	$2,041.66	$125,684.55
Benefits	$21,784.78	$622.91	$22,407.69
In-State Travel	$15,755.04	$678.24	$16,433.28
Expendable Supplies	$17,141.10	$503.14	$17,644.24
Tuition	$13,348.50		$13,348.50
Reporting	$0.00		$0.00
MDT Direct Costs	$191,672.31	$3,845.95	$195,518.26
Overhead	$33,910.33	$769.21	$34,679.54
MDT Share	$225,582.64	$4,615.16	$230,197.80
WTI Share (Equipment and Out-of-State Travel)	$48,000.00		$48,000.00
Total	**$273,582.64**	**$4,615.16**	**$278,197.80**

Task A: Project Management

Work in this area generally focused on regularly downloading long-term strain data from the bridges and maintaining the data acquisition equipment and associated software.

Task B: Conduct Literature Review

The primary literature review for this project has been completed. Nonetheless, the time frame for this project is quite long, so information will continue to be collected throughout its duration. Relevant literature collected throughout the first 2½ years of the project is summarized in the interim report (July 2004). New information collected since then will be summarized in the final report for the project.

Action Items for next quarter:

- Continue collecting and synthesizing relevant literature

Task C: Develop Instrumentation Plan and Assemble Data Acquisition System

Determine Gage Locations

All proposed work has been accomplished for this task, and no additional work is anticipated. Past accomplishments for this task are summarized in the interim project report.

Weather Station

The remote weather station continues to function well, collecting pertinent weather information every 15 minutes and automatically downloading it to a central, searchable database.

Bridge Monitoring Data Acquisition System

Last quarter, the data acquisition equipment on the HPC bridge deck began to experience technical problems. Hardware and software solutions were employed to remedy these problems. At the same time, the data acquisition systems on the Empirical and Conventional bridge decks were similarly reconfigured to avoid analogous problems with them in the future. System changes included updating the software on the data acquisition computers, programming the data loggers to benefit from power saving functions, and increasing data storage by adding a memory card. Currently, all data acquisition problems have been remedied, and the long term monitoring equipment is functioning properly.

Action Items for Next Quarter:

- Continue to preserve and maintain the accuracy of long-term monitoring system

Task D: Install Instrumentation and Compile As-Built Documentation

Instrumentation Installation

All proposed work has been accomplished for this task, and no additional work is anticipated. Past accomplishments for this task are summarized in the interim project report (July 2004).

Materials Testing

The properties of all the materials used to construct the three Saco bridge decks were summarized and included in the interim report.

Action Items for Next Quarter

- Continue periodic measurement of shrinkage specimens

Task E: Live Load Testing

Preliminary planning for the final live load tests scheduled for July 2005 has begun. Next quarter, WTI will contact MDT in Malta to schedule the test trucks and the traffic control.

Action Items for Next Quarter

- Schedule test trucks and traffic control for live load tests

Task F: Long-Term Monitoring

Strain Monitoring

Approximately 22 months of long-term data has been collected from selected sensors in each of the bridge decks. All the active long term sensors are currently set up to provide measurements once every hour. As described above, data acquisition problems have been remedied, and since that time, data generally has been collected from all three bridge decks without interruption. The long-term strain data is currently being analyzed to determine temperature related effects on the performance of each of the bridge decks.

Action Items for Next Quarter:

- Continue long-term monitoring of strain and temperature in the bridge decks

Large Vehicle Event Monitoring

The data loggers continued to monitor large vehicle events throughout this quarter, and the raw data are being analyzed. Comparisons of events captured by the roadside classifier and those captured by the bridges' data acquisition systems are currently underway. Early comparisons indicate that the permanent roadside vehicle classifier near the bridges is malfunctioning, and this problem will be investigated and rectified next quarter.

Action Items for Next Quarter:

- Continue collecting large vehicle event data
- Make comparisons between data collected from the bridges to data collected by the classifier
- Investigate and repair problems with roadside vehicle classifier near bridges

Corrosion Testing

The next set of carbonation and half-cell tests will be conducted when WTI researchers visit the Saco bridges in July 2005 during the second live load tests.

Crack Mapping

No new cracks in the bridge decks were detected during the crack survey conducted during this quarter by Craig Abernathy of MDT.

Task G: Analysis

The data available from the long term monitoring effort continues to be studied to correlate changes in deck performance with the vehicle and environmental loads they have experienced. The relative performance of the three deck types will be further evaluated by comparing their responses under the seasonal and daily temperature fluctuations they experience. This analysis will be summarized in the final report for the project.

Action Items for Next Quarter:

- Continue to organize and analyze long-term strain data

Task H: Project Reporting

A presentation was delivered at the annual TRB meeting (January 9-13, 2005) to inform others of the progress of this project. The presentation was given during the Dynamics and Field Testing of Bridges committee meeting (AFF40).

Action Items for Next Quarter:

- Quarterly progress report for fourth quarter of state fiscal year 2005